REMARKS

Claim 3 was objected to as lacking antecedent basis and adequate support in the disclosure. To overcome these objections, Claim 3 has been canceled.

The Examiner's presumption that the subject matter of the claims has been commonly owned at all relevant times is correct.

Claims 1 and 2 were rejected under 35 U.S.C. §103(a) as being unpatentable over US Pat. 5,882,302 (Driscoll, Jr.) in view of US Pat. 4,007,735 (Magnusson). Amended Claim 1 describes an ultrasonic intracavity probe for scanning a volumetric region from within the body comprising a handle section to be held during use of the probe; and a shaft section having a distal end which is to be inserted into a body cavity during use of the probe; a pivotally mounted array transducer located in the distal end of the shaft section; a motor located in the handle section; a drive mechanism coupled to the motor and the array transducer which acts to move the array transducer during scanning; and a liquid bath constrained to the shaft section to the exclusion of the handle section and located in the distal end of the shaft, a portion of which is located between the array transducer and the distal end of the shaft during scanning, wherein the center of gravity of the probe is located in the handle section. As is commonly known, when an ultrasonic imaging probe has a transducer which is swept or oscillated inside the probe to scan a body, an acoustic coupling medium must be located between the transducer and the surrounding acoustic window of the probe to couple ultrasound between the acoustic window and the transducer, as ultrasound does not travel through air without severe attenuation. The common way to do this is to immerse the moving transducer in a liquid such as mineral oil or water. But a liquid is heavy and adds weight to the probe, a problem which is compounded when the probe is an elongated probe such as an intracavity probe. In that case, the liquid not only adds weight but, by the necessity of being at the end of the probe where the transducer is located, undesirably shifts the center of gravity toward the distal (transducer) end of the probe, making the probe more difficult to manipulate and control. The problem is further compounded when the probe is designed for 3D imaging, as a 3D imaging array transducer must be used and not the smaller single piston or annular array transducers which are used in 2D imaging. The present inventors have overcome these obstacles by confining the liquid to the shaft of an intracavity probe where it provides acoustic coupling between the array transducer and the acoustic window at the distal end of the probe, and still kept the center of gravity in the handle of the

probe. Confining the liquid to the shaft also avoids complications of the liquid passing around or through the motor of the probe in the handle section of the probe.

Driscoll, Jr. describes an intracavity probe designed for providing therapy with high intensity focused ultrasound (HIFU). This probe has a coupling fluid contained within the transducer region 30 of the probe housing. There is also a reservoir 36 in the handle of the probe. Figs 3 and 4 show structure which is not called out in this patent, but is described with reference numerals in identical Figs. 4 and 10 of the parent patent US 5,762,066 (Law et al.) As explained in column 12, lines25-28 of Law et al., the reservoir 36 is in fluid communication with the transducer region 30 through a fluid pressurization and recirculation system. This system is described in detail in the section of the patent entitled "Pressurization System" in columns 17-18. There it is made clear that fluid flows to the transducer region through a supply lumen 126 and returns through a return lumen 128. Thus, the fluid compartments in the tip of the probe and the handle are joined by these lumens. The supply reservoir 36 adds weight to the handle of the probe which may help balance the probe, but at the expense of an overall heavier probe. The present claimed invention by contrast states that the liquid in the probe is constrained to the shaft section of the probe to the exclusion of the handle section, and yet the center of gravity of the probe is nonetheless located in the handle section. The claimed probe is thus easy to control and manipulate, and aided by the light weight of the probe due to the absence of fluid in the handle. In addition, problems with fluid passageways around the motor (34 in Driscoll, Jr.) and potential fluid intrusion are eliminated in the claimed invention by constraining the liquid bath to the shaft section. The pressurized air-driven vibrator of Magnusson adds nothing in this regard, as the Magnusson probe contains no fluid at all. There is also no basis for believing that a designer of ultrasound probes would look to cervical dilation vibrators for technical features. For these reasons it is respectfully submitted that the combination of Driscoll, Jr. and Magnusson cannot render Claims 1 and 2 unpatentable.

Claims 4-10 were rejected under 35 U.S.C. §103(a) as being unpatentable over Driscoll, Jr. in view of Magnusson and further in view of US Pat. 6,039,694 (Larson et al.) Larson et al. describe various hydrogel sheaths which provides acoustic coupling and a microbial barrier when slipped over an ultrasound probe. Larson et al., like Magnusson, is unconcerned with the design of a fluid-filled probe. Thus, Larson et al. adds nothing to the combination of Driscoll, Jr. and Magnusson which would render Claim 1 and its dependent Claims 4-10 unpatentable. It is therefore respectfully submitted that Claim 1 and its

dependent Claims 4-10 are patentable over the combination of Driscoll, Jr., Magnusson and Larson et al.

Claims 11-16 were rejected under 35 U.S.C. §103(a) as being unpatentable over Driscoll, Jr. in view of Magnusson and further in view of US Pat. 6,315,710 (Bushek et al.) Bushek et al. describes an implantable hearing assistance system for the middle ear. The system of Bushek et al. is, like Magnusson, unconcerned with fluid-filled ultrasound probes and it has nothing to do with motor-driven transducer assemblies. There is also no basis for believing that a designer of ultrasound probes would look to implantable hearing aid devices for technical features. For these reasons it is respectfully submitted that the combination of Driscoll, Jr., Magnusson, and Bushek et al. cannot render Claim 1 or its dependent Claims 11-16 unpatentable.

Claims 17-20 were rejected under 35 U.S.C. §103(a) as being unpatentable over Driscoll, Jr. in view of Magnusson and further in view of Bushek et al. and further in view of US Pat. 6,621,065 (Fukumoto et al.) Fukumoto et al. is concerned with a CCD camera for a testing system. Like Magnusson and Bushek et al., Fukumoto et al. is unconcerned with fluid-filled probes or ultrasound and hence the combination of Driscoll, Jr., Magnusson, Bushek et al., and Fukumoto et al. cannot render amended Claim 1 unpatentable. Since Claims 17-20 all ultimately depend from Claim 1, it is respectfully submitted that Claims 17-20 are patentable over Driscoll, Jr., Magnusson, Bushek et al., and Fukumoto et al. by reason of this dependency.

The Englehart et al. patent with its large fluid reservoir in front of the transducer has been reviewed and is not believed to affect the patentability of the amended claims.

In view of the foregoing amendment and remarks, it is respectfully submitted that Claims 1, 2, and 4-20 are patentable over any combination of Driscoll, Jr., Magnusson, Bushek et al., and Fukumoto et al. Accordingly it is respectfully requested that the rejection of Claims 1, 2, and 4-20 under 35 U.S.C. §103(a) be withdrawn.

In light of the foregoing amendment and remarks, it is respectfully submitted that this application is now in condition for allowance. Favorable reconsideration is respectfully requested.

Respectfully submitted,

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